PATENT CLAIMS

1. Position sensor according to the transit time principle of a mechanical-elastic wave with

- a waveguide (3)
- a detector coil (5) arranged on the waveguide (3),
- a position element, i.e. a position magnet (28), which can be moved along the waveguide (3)

characterized in that

- the waveguide (3) is made of electrically conductive material,
- the detector coil (5) in the detector range is arranged coaxially on the waveguide (3).

2. Position sensor under claim 1,

characterized in that

the detector coil (5) is assigned to a flux guide unit (30).

3. Position sensor according to the transit time principle of a mechanical-elastic wave with

- a waveguide (3)
- a detector coil (5) arranged on the waveguide (3),
- a position element, i.e. a position magnet (28), which can be moved along the waveguide (3),

in particular under one of the preceding claims,

characterized in that

at least in the axial range of the detector coil (5) the electrical return (6) is coaxially arranged externally around the detector coil (5).

4. Position sensor under one of the preceding Claims,
characterized in that
the waveguide (3) possesses a solid cross-section.

5. Position sensor under one of the preceding claims,
characterized in that
the cross-section of the waveguide (3) in particular is solid throughout the entire measurement range.

6. Position sensor under one of the preceding claims,
characterized in that
the detector (5) is also a part of a detector arrangement just like a detector circuit (50).

7. Position sensor under one of the preceding claims,
characterized in that
the flux guide unit (30) of the detector coil (5) is assigned so that it simultaneously shields the detector coil (5) against undesired external magnetic fields.

8. Position sensor under one of the preceding claims,
characterized in that
the magnetic flux path of the magnetic flux enabled by the flux guide unit (30) encloses the windings of the coil at least once, in particular including the waveguide (3) in the flux path.

9. Position sensor under one of the preceding claims,
characterized in that
the flux path enabled by the flux guide unit (30) surrounds the entire coil, in particular in at least one layer, in particular at least one axial layer, in particular surrounding the coil completely.

10. Position sensor under Claim 8,
characterized in that
the return (6) consists of electrically conductive and also magnetic shielding material with a permeability of $\mu>1$.

11. Position sensor under Claim 9,
characterized in that
The return (6) exhibits an extensively as possible, in particular completely enclosed cross-section.

12. Position sensor under one of the preceding claims,
characterized in that
the shielding, in particular the flux guide unit (30), encloses the detector coil (5) at least partially, in particular along the layer, in particular an axial layer of the detector coil (5), in particular coaxially encloses.

13. Position sensor under one of the preceding claims,
characterized in that
the detector coil (5) is constructed as a self-supporting coil without coil shell.

14. Position sensor under one of the preceding claims,
characterized in that
the detector coil (5) is wrapped on a coil shell, in particular a H-shaped coil shell in the longitudinal view.

15. Position sensor under one of the preceding claims,
characterized in that
the shielding, in particular the flux guide unit (30), completely encloses the detector coil (5) except for the opening (5a) for the waveguide (3) as well as at least on guide opening (5b) for the electrical conductors connected to the detector coil (5).

16. Position sensor under one of the preceding claims,
characterized in that
the flux guide unit (30c) is primarily shell-shaped, in particular cylindrically shaped with two openings opposing openings in the enclosed front side (5a, 5a') for entry and exit of the waveguide (3) and a conductor opening (5b) for the passage of the electrical conductor for the detector coil (5), in which the conductor opening (5b) in particular is found in the cylindrical surface area of the flux guide unit (30).

17. Position sensor under one of the preceding claims,
characterized in that
the cylindrical flux guide unit (30) consists of a cup-shaped body with an open front side and a suitable cover on this frontal opening.

18. Position sensor under one of the preceding claims,
characterized in that
the cylindrical housing consists of two half-cylindrical shells.

19. Position sensor under one of the preceding claims,
characterized in that
the flux guide component (30) consists of a ferromagnetic material with a permeability of $\mu > 10$, in particular $\mu > 1{,}000$, in particular $\mu > 10{,}000$.

20. Position sensor under one of the preceding claims,
characterized in that
the flux guide component (30) consists of a highly permeable alloy, in particular out of ferrite.

21. Position sensor under one of the preceding claims,
characterized in that
direct current is flowed through the waveguide (3).

22. Position sensor under one of the preceding claims,

characterized in that

the detector arrangement (105) does not include any magnets, in particular no bias magnets.

23. Position sensor under one of the preceding claims,

characterized in that

the axial direction of the detector coil (5) corresponds with the longitudinal direction of the waveguide (3).

24. Position sensor under one of the preceding claims,

characterized in that

the detector coil (5) is a toroid coil.

25. Position sensor under one of the preceding claims,

characterized in that

axial length of the toroid coil at least corresponds to the diameter of its free central opening (5a), is preferably at least twice as large.

26. Position sensor under one of the preceding claims,

characterized in that

the toroid coil is enclosed by a flux guide unit (30), which has a somewhat cylindrical form and preferably consists of two half-shells, which a enclosed by a front side in each case, except for a central passage opening (5a), analogous to the passage opening of the toroid coil and its contact layer runs diagonally to the longitudinal axis of the toroid coil and the flux guide unit (30).